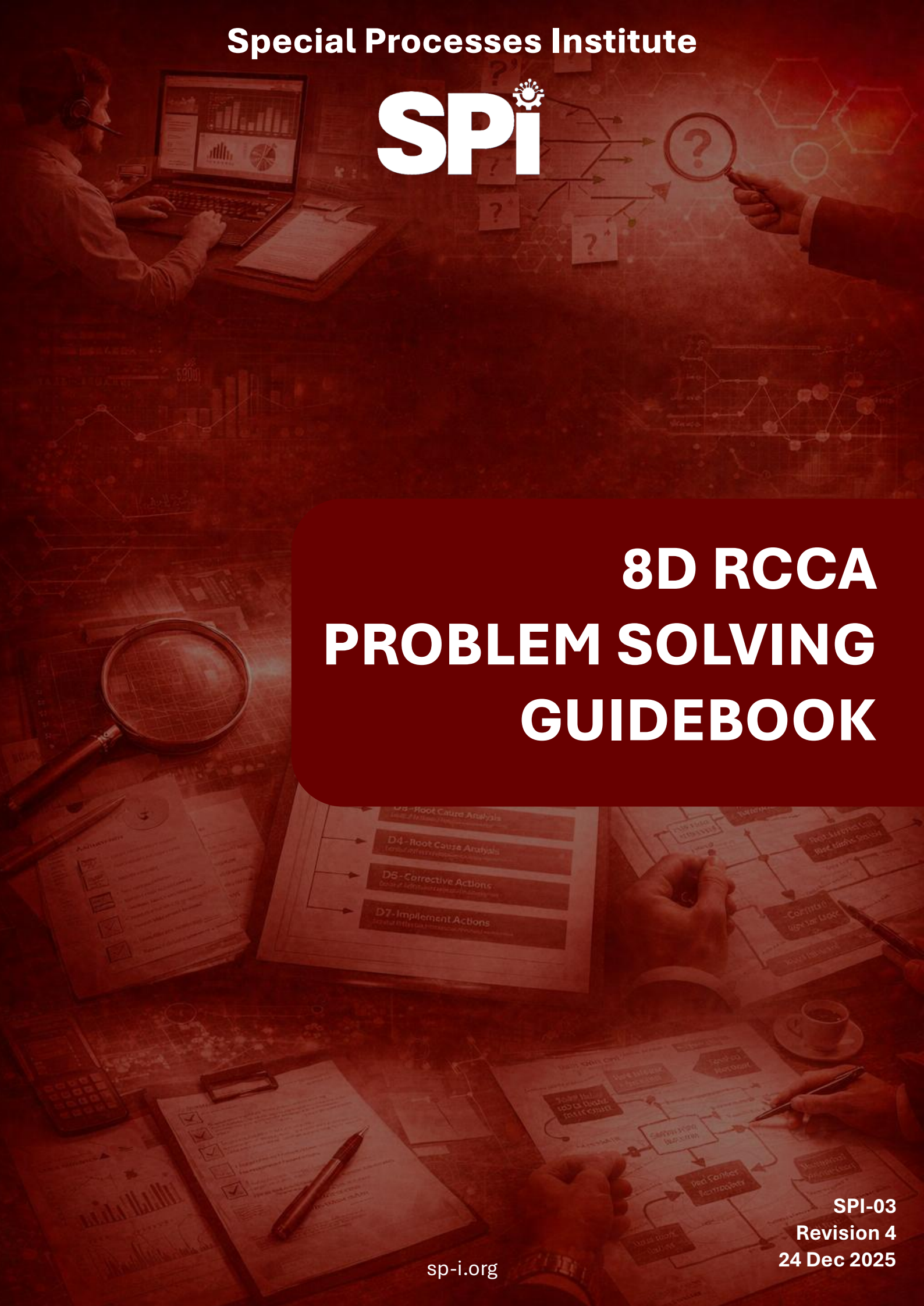
Special Processes Institute

SPI

8D RCCA PROBLEM SOLVING GUIDEBOOK



SPI-03
Revision 4
24 Dec 2025

8D RCCA Problem Solving Guidebook

Contents

1. Introduction 2
1.1. Purpose 2
1.2. Scope 2
2. Quality Requirements 2
2.1. ISO9001 10.2 Nonconformity and Corrective Action 2
3. Failure Event and the Approach 2
3.1. Events That May Trigger RCCA 2
3.2. The Incorrect Approach to Failure. 2
3.2.1. Problem → Fix It 2
3.2.2. Short-term Containment Over Structured Investigation 2
3.2.3. Quick Fix 3
3.3. The Correct Approach to Failure: Structured Root Cause Corrective Action 3
3.3.1. Contain the Problem 3
3.3.2. Right People 3
3.3.3. Process and System Causes 3
3.3.4. Prevent Recurrence 3
3.3.5. Risks and Opportunities 3
3.3.6. Expected Behaviours to Get Systemic Solutions 3
3.3.7. Act in Proportion 4
4. The 8D Process 4
4.1. The Eight Disciplines 4
4.1.1. D0 – Initiate immediate containment actions 4
4.1.2. D1 – Establish a cross-functional team 4
4.1.2.1. The Natural Team 4
4.1.2.2. The Qualified Team 4
4.1.3. D2 – Define and describe the problem 5
4.1.4. D3 – Implement and optimise containment actions 5
4.1.5. D4 – Identify and verify root cause(s) 5
4.1.5.1. The Causal Chain 5
4.1.5.2. The 5 Why Process 5
4.1.6. D5 – Define and select permanent corrective actions 6
4.1.6.1. Corrective Action 6
4.1.6.2. What Corrective Action Is Not 6
4.1.6.3. Types of Corrective Action 6
4.1.6.4. Effective Corrective Action 6
4.1.6.5. Review of Corrective Action 6
4.1.6.6. Verification of Effectiveness 6
4.1.7. D6 – Implement corrective actions and verify effectiveness 6
4.1.7.1. Review Process 7
4.1.7.2. Verification of Effectiveness 7
4.1.8. D7 – Risks and Opportunities – Preventive Action 7
4.1.8.1. Preventive Action 7
4.1.8.2. Lessons Learned 7
4.1.9. D8 – Recognise the team and formally close the activity 7
4.2. When to Apply a Structured Root Cause Analysis and Problem-Solving Process 8
5. Example of an 8D Form 9
6. Document Revision Control 10

8D RCCA Problem Solving Guidebook

1. Introduction

1.1. Purpose

The purpose of this guide is to improve awareness, understanding and effective management of nonconformities. The most current version of this document is maintained online at https://sp-i.org and should be considered the authoritative source. This guide is provided for open use and may be reproduced or excerpted, in whole or in part, without restriction.

1.2. Scope

This document defines the Root Cause Corrective Action (RCCA) process used to identify the underlying causes of non-conformances, incidents, or adverse events, and to determine and implement effective corrective actions that prevent recurrence. The RCCA process described herein is aligned with long-standing requirements. While these requirements are well established, this document provides clarity and structure to ensure consistent, rigorous and effective application of RCCA principles using the 8D process.

2. Quality Requirements

2.1. ISO9001 10.2 Nonconformity and Corrective Action

When a nonconformity (non-fulfilment of a requirement) occurs, including those arising from complaints, the organisation shall react promptly to control and correct the nonconformity and to address any resulting consequences. The organisation shall then evaluate the need for corrective action to eliminate the cause or causes of the nonconformity, in order to prevent recurrence or occurrence elsewhere. This evaluation shall include a review and analysis of the nonconformity to determine root cause, taking into account contributing factors, including human factors where applicable.

The organisation shall determine whether similar nonconformities exist, or could potentially occur, implement the necessary corrective actions, and review the effectiveness of those actions. Risks and opportunities identified during planning shall be updated as appropriate, and changes to the quality management system shall be made where necessary. Where an external provider is responsible for the nonconformity, corrective action requirements shall be flowed down accordingly. Specific actions shall be taken where timely and effective corrective action is not achieved.

3. Failure Event and the Approach

3.1. Events That May Trigger RCCA

RCCA may be initiated in response to a range of events, including, but not limited to:

Events That May Trigger RCCA	
Product or process failure	Statistical Process Control (SPC) outputs
Incident or near miss	Accident
Nonconformance	Customer complaint
Audit finding	Failure modes identified through FMEA activities

3.2. The Incorrect Approach to Failure.

3.2.1. Problem → Fix It.

A common but ineffective response to failure is a linear “problem to fix” approach, where the focus is placed on restoring operation as quickly as possible rather than understanding why the failure occurred. In this scenario, a problem is identified and immediate action is taken to correct the visible symptom. Once the symptom has been removed and operations resume, the issue is considered resolved.

3.2.2. Short-term Containment Over Structured Investigation

This approach typically prioritises short-term containment over structured investigation. Limited time is spent defining the problem accurately, gathering data, or analysing contributing factors. As a result, actions such as repair, rework, adjustment, or replacement are implemented without establishing the true root cause. While these actions may temporarily restore functionality, they do not address the underlying conditions that allowed the failure to occur.

3.2.3. Quick Fix

The “quick fix” mindset often leads to repeated failures, as the same root cause remains present within the system. Teams may move from one incident to the next, applying similar corrective actions without learning from previous events. In some cases, the focus shifts to assigning blame or identifying an individual responsible, rather than examining weaknesses in the process, controls, or system design.

- Not taking adequate time for analysis.
- Only replacing, repairing or reworking the product
- Going from one crisis to another.
- Looking for the guilty party - “Who did that?” Blaming or transferring responsibility.
- Generate laundry list of solutions to firefight the symptoms.
- Narrow focus taken to address the immediate problem.
- Focus on performance metrics/measures (e.g., sales, profits) with hope that processes will improve by themselves.

3.3. The Correct Approach to Failure: Structured Root Cause Corrective Action

3.3.1. Contain the Problem

The correct approach to failure is a disciplined, structured response that focuses on understanding and eliminating the root cause rather than simply correcting the visible symptom. When a problem occurs, the immediate priority is to contain the issue to protect the customer and the organisation. However, containment is recognised as a temporary measure, not a solution.

3.3.2. Right People

Once containment is in place, a cross-functional team is established with the appropriate knowledge of the product, process, and systems involved. The team clearly defines the problem using factual, measurable information and gathers relevant data to understand what happened, where it occurred, and under what conditions. Assumptions are avoided, and conclusions are based on evidence.

3.3.3. Process and System Causes

Root cause analysis is then performed to identify not only the direct cause of the failure, but also the systemic causes that allowed it to occur and escape detection. This includes consideration of process weaknesses, controls, interfaces and human factors where applicable. The objective is to answer the question “How and why did this happen?” rather than “Who was responsible?”.

3.3.4. Prevent Recurrence

Corrective actions are developed to address the verified root causes and to prevent recurrence. These actions are evaluated to ensure they are practical, effective and proportionate to the risk. Once implemented, the effectiveness of the corrective actions is verified through data, monitoring, or audit, rather than assumption.

3.3.5. Risks and Opportunities

Finally, lessons learned are captured and shared, risks and controls are updated, and relevant changes are made to procedures, training, or the quality management system. Through this structured RCCA approach, failures are used as opportunities for learning and continuous improvement, resulting in sustainable performance improvement and information dissemination to prevent similar problems from occurring elsewhere.

3.3.6. Expected Behaviours to Get Systemic Solutions

- Understand that many factors contribute to a complex situation.
- Fully understand the actual problem and then address the systemic root cause(s).
- Permanently fix and improve performance.
- Seek total understanding of the process.
- Take time to understand the big picture; don’t let your solution be a cause of another problem.
- Never human error as a root cause – focus on improving processes to eliminate human error (human factors).

3.3.7. Act in Proportion

To ensure customer satisfaction, organisations must deliver safe and reliable products and continually improve their performance to meet, and where possible exceed, customer and regulatory authority requirements. This includes the establishment of effective processes to identify, analyse and eliminate significant or recurring issues. Corrective actions shall be commensurate with the severity of the problem and proportionate to the associated risk.

4. The 8D Process

Eight Disciplines (8D) Problem Solving is a structured methodology originally developed by the Ford Motor Company to systematically address and resolve problems. It is widely used by engineers and quality professionals as a framework for product and process improvement. The objective of the 8D approach is to identify, correct, and permanently eliminate the causes of actual or potential recurring problems through a disciplined, evidence-based process.

4.1. The Eight Disciplines

4.1.1. D0 – Initiate immediate containment actions

Objective: To contain the problem in order to protect the customer by preventing further escalation or impact. This includes ensuring the situation remains stable until the root cause and any contributing causes have been identified and addressed.

Key containment activities include:

- Stop – Prevent further production of nonconforming product or escalation of the issue
- Identify and Evaluate – Determine affected product, processes, personnel, and equipment
- Quarantine – Isolate and control affected product or equipment to prevent unintended use
- Communicate – Inform relevant stakeholders, including the customer where an escape is suspected

4.1.2. D1 – Establish a cross-functional team

Objective: To ensure that all process owners, performers, and relevant stakeholders who may influence the corrective action process and associated investigation are appropriately represented within the team. This includes internal functions as well as external parties where applicable (e.g. suppliers or customers).

4.1.2.1. The Natural Team

The natural team comprises those with direct ownership of the problem and responsibility for its resolution. Consideration should be given to the following:

- Who owns the process or area where the problem occurred?
- Who has a direct interest in the outcome and the effectiveness of the solution?
- Who are the accountable owners of both the problem and the corrective action?
- Who has detailed knowledge of the process, supported by data and experience?
- Who will be required to implement, maintain, and work with the corrective action?

A common failure in RCCA activities is the assignment of inappropriate personnel, often limiting participation to the Quality function alone. This approach reduces effectiveness and undermines ownership of the solution.

4.1.2.2. The Qualified Team

The qualified team includes individuals who provide additional capability, insight, or authority to support effective problem resolution, such as:

- Personnel able to contribute supplementary information or analysis
- Subject Matter Experts (SMEs) with relevant technical expertise
- Advisors who can provide independent or specialist guidance
- Management representatives who can provide support, prioritisation, and resources

Without full engagement, commitment and support from the relevant stakeholders, corrective actions are unlikely to be effective or sustainable in the long term.

4.1.3. D2 – Define and describe the problem

Objective: To fully understand the significance, impact and extent of the problem, including its depth and breadth under current conditions, and to ensure the problem is accurately defined and clearly understood by the team and all relevant stakeholders.

Key principles include:

- Achieving a clear and shared understanding of the problem before progressing to analysis or solution development
- Determining whether a single issue exists or whether multiple, related problems are present
- Recognising gaps in knowledge and identifying what additional information is required
- Maintaining clarity and simplicity in the problem statement; if the problem cannot be described simply and unambiguously, it is not yet fully understood

4.1.4. D3 – Implement and optimise containment actions

Objective: To ensure that containment actions fully address the defined problem and that immediate corrective actions are appropriate to the severity of the issue, correctly implemented, and demonstrably effective.

All nonconforming product, data, or output shall be identified, isolated, and corrected to prevent escape to the customer. Immediate corrective actions shall be reviewed and optimised as necessary to ensure adequate control of the situation.

Additional containment actions may include, but are not limited to:

- Correction of product through replacement, repair, or rework of affected items
- Agreement with the customer or supply chain representative on credit, replacement, or recovery arrangements
- Temporary increases in production capacity to support customer demand
- Enhanced or additional inspection earlier in the process
- Product recall or segregation of stock at suppliers and sub-tier providers, where applicable

4.1.5. D4 – Identify and verify root cause(s)

Objective: To identify, through structured root cause analysis, the underlying causes of an undesirable condition, situation, nonconformity, or failure, including the reason the issue was not detected. Root cause analysis shall identify the direct cause, contributing causes, and the root cause of the problem. This analysis is a systematic approach to understanding all factors that led to the problem before defining and implementing permanent corrective actions.

4.1.5.1. The Causal Chain

Root cause analysis is based on understanding the causal chain:

Root Cause → Contributing Causes → Direct Cause → Problem

- The direct cause is the immediate cause that resulted in the problem
- Contributing causes are intermediate factors that influenced or enabled the direct cause
- The root cause is the final underlying cause in the chain

The root cause is not necessarily the most visible or significant cause, but it is the last cause in the chain that, if addressed, will prevent recurrence of the problem.

4.1.5.2. The 5 Why Process

The “5 Whys” technique is one method used to identify the causal chain. The process begins by stating the problem as an event-based question starting with “Why?”.

An event question should be short, clear, and focused on a single problem. The term “5 Whys” does not imply that the question must be asked exactly five times. A root cause may be identified after three iterations, or it may require seven or more, depending on the complexity of the issue.

Key principles of the 5 Whys process include:

- Keeping the questions simple and focused
- Asking clear and direct “Why?” questions
- Providing concise, factual answers supported by evidence

4.1.6. D5 – Define and select permanent corrective actions

Objective: To define, prioritise, and select corrective actions that address identified root and contributing causes, and to permanently prevent the recurrence of the undesirable condition, situation, nonconformity, or failure.

4.1.6.1. Corrective Action

A set of planned activities (actions) implemented for the sole purpose of permanently eliminating the cause of a nonconformity and to prevent recurrence. (Ref.: ISO 9000 3.12.2).

4.1.6.2. What Corrective Action Is Not

Corrective action is often incorrectly interpreted as activities such as replacement, repair, rework, or other actions taken to rectify nonconforming product. These activities address symptoms rather than causes and should be considered part of containment or immediate corrective actions (D3). A common failure in RCCA is focusing solely on correcting symptoms rather than eliminating the underlying causes.

4.1.6.3. Types of Corrective Action

Corrective actions may be categorised as follows:

- Specific corrective actions, which address the direct cause or immediate effect of the problem
- Sustaining corrective actions, which address contributing and root causes to prevent recurrence

If only a single cause has been identified, the corrective action is unlikely to be fully effective. It should be recognised that today's contributing cause can become tomorrow's root cause if left unaddressed.

4.1.6.4. Effective Corrective Action

Effective corrective actions shall meet the following criteria:

- Address verified root causes
- Address relevant contributing causes
- Be practical and achievable, with objectives that are Specific, Measurable, Achievable, Relevant, and Time-bound (SMART)
- Have a clearly defined implementation or effectiveness date
- Be sustainable over time
- Not introduce new or unintended nonconformities
- Be subject to review

4.1.6.5. Review of Corrective Action

A review process shall be established to ensure corrective actions are implemented in accordance with the agreed plan and remain effective over time. This includes:

- Confirmation that all planned actions have been completed
- Definition of the type, frequency, and scope of additional checks or audits
- Identification of effectiveness measures, including responsibility, method, location, frequency, and conditions
- Measurement and analysis of process performance following implementation, with comparison against baseline or previous performance

4.1.6.6. Verification of Effectiveness

Where corrective actions are found to be ineffective, the RCCA process shall return to D4 (Identify Root Cause) to reassess the accuracy of the root cause analysis and the adequacy of corrective action development and implementation.

Where corrective actions are verified as effective, containment actions may be reviewed and progressively removed (e.g. cessation of over-inspection or temporary production controls), provided this does not adversely affect product or process performance. Evidence of actions taken and results achieved shall be recorded, including both effective and ineffective outcomes.

4.1.7. D6 – Implement corrective actions and verify effectiveness

Objective: To ensure that all selected corrective actions are implemented as defined and to verify their effectiveness in preventing recurrence of the undesirable condition and/or ensuring sufficient detection earlier in the process.

At this stage of the corrective action process, there is a common tendency to prioritise the easiest or quickest solutions, with insufficient planning to verify timely implementation and overall effectiveness. This often results in corrective action plans being only partially implemented. The key responsibility of the team leader at this stage is to ensure that the complete corrective action plan is implemented in full, within the agreed timescales, and that the actions taken are effective.

4.1.7.1. Review Process

A structured review process shall be established to confirm that corrective actions are implemented in accordance with the plan and remain effective over time. This process shall include:

- Process confirmation, verifying that all planned actions have been completed
- Definition of additional checks and audits, including their type, scope, and frequency
- Identification of effectiveness measures, including responsibility, method, location, frequency, and conditions
- Measurement and analysis of post-implementation performance, with results compared against performance measured during problem definition and root cause analysis (Steps D2 and D4)

4.1.7.2. Verification of Effectiveness

The effectiveness of the proposed solutions shall be verified as follows:

- Where corrective actions are found to be ineffective, the RCCA process shall return to D4 (Identify Root Cause) to reassess the accuracy of the root cause analysis and the adequacy of corrective action development or implementation
- Where corrective actions are verified as effective, containment actions shall be reviewed and, where appropriate, progressively removed (e.g. cessation of over-inspection, over-production, or temporary logistics controls), without adversely affecting product or process performance
- Evidence of completed actions and associated results shall be recorded, including identification of what has been effective and what has not

4.1.8. D7 – Risks and Opportunities – Preventive Action

Objective: To formally document the analysis performed, results achieved, and changes implemented, and to capture and share learning with relevant stakeholders in order to prevent similar undesirable conditions, situations, nonconformities, or failures occurring elsewhere within the organisation or supply chain.

4.1.8.1. Preventive Action

A set of planned activities (actions) implemented for the sole purpose of permanently eliminating the cause of a potential nonconformity or other potential undesirable situation. Preventive action is taken to prevent occurrence whereas corrective action is taken to prevent recurrence. (Ref.: ISO 9000 3.12.1).

4.1.8.2. Lessons Learned

The organisation shall identify other products, data sets, production lines, facilities, or suppliers that may be susceptible to the same or similar undesirable condition, situation, nonconformity, or failure. This assessment may include similarities in design, process, material or supplier source, location, function or use, operating environment, training, and machinery or tooling.
Relevant lessons learned and applicable information arising from the investigation shall be documented and communicated to the identified business areas, production lines, facilities, or suppliers to enable proactive action and reduce the risk of occurrence elsewhere.

4.1.9. D8 – Recognise the team and formally close the activity

Objective: To confirm that all corrective actions have been successfully implemented, to formally close the activity, to ensure lessons learned are appropriately communicated, and to recognise the contribution of the team and relevant stakeholders.

All actions shall be verified as complete and effective, with a documented summary of the problem, root causes, corrective actions, and methodology retained as organisational knowledge. Applicable stakeholders affected by the undesirable condition, situation, nonconformity, or failure shall be informed that the activity is closed. Team members involved in the corrective action process shall be formally recognised, and the team disbanded.

Formal closure is essential to prevent action items remaining open unnecessarily, which can divert individuals from their primary responsibilities. In addition, failure to provide feedback on outcomes and recognise team contributions undermines closed-loop corrective action and negatively impacts the effectiveness and culture of RCCA within the organisation.

4.2. When to Apply a Structured Root Cause Analysis and Problem-Solving Process

A structured root cause analysis and problem-solving process shall be applied whenever one or more of the following conditions exist:

- Actual or potential safety impact to personnel or product
- Product strength, performance, or reliability concerns
- Significant impact on production or maintenance operations
- Interruption or stoppage of production or maintenance activities, or prevention of downstream operations from proceeding satisfactorily
- Regulatory authority concern or customer dissatisfaction
- Significant cost impact to the customer or the organisation
- Disruption to supplier processes or customer operations
- Repetitive or recurring issues affecting the same part, process, or similar activities
- Problems that are difficult to detect through existing controls
- Customer-requested investigation or corrective action
- Significant quality or quality management system (QMS) issues

A structured approach is particularly necessary for complex problems that cannot be effectively resolved by personnel at the point of occurrence alone and require cross-functional involvement. In all cases, both the severity of impact and the frequency of occurrence shall be considered when determining whether to initiate a formal root cause analysis.

8D RCCA Problem Solving Guidebook

5. Example of an 8D Form

This form is available for download in Microsoft Word format and may be adapted to meet the organisation's needs. It should be completed in accordance with this guidance document. Download here.

8D REPORT

Ref	Customer / Ref	Product / Process	Date	Target Closure	Date Closed

Progress	0	1	2	3	4	5	6	7	8
	IMMEDIATE CONTAIN	FORM TEAM	DEFINE PROBLEM	DEVELOP CONTAIN	ROOT CAUSE ANALYSIS	PLAN CORRECTIVE ACTION	IMPLEMENT CORRECTIVE ACTION	RISK OPPORTUNITY PREVENT	CLOSE OUT
Complete Dates									

Further Information	

8D **Initiate immediate containment actions**

0

8D **Establish a cross-functional team**

1

Function	Name	Phone	Email	Notes

8D **Define and describe the problem**

2

Initial Problem Statement / Description	Defined Problem Description
Requirement & Nonconformity	**Defined Problem Statement**

8D **Develop containment actions**

3

8D **Identify and verify root cause(s)**

4

8D **Identify corrective action**

5

8D	Implement corrective actions and verify effectiveness
6	
8D	**Risks and Opportunities – Preventive Action**
7	
8D	**Recognise the team and formally close the activity**
8	
Notes	

6. Document Revision Control

Rev	Date	Change	Author
1	10 Sep 2016	Established the 8D RCCA Problem Solving Guidebook	Konrad Burgoyne
2	25 Jan 2017	Addition of the causal chain explanation	Konrad Burgoyne
3	22 Nov 2020	Addition of the 8D form	Konrad Burgoyne
4	24 Dec 2025	Rebranding update to document	Konrad Burgoyne

sp-i.org
email@sp-i.org